There are some major changes in the present equipment that should be made in order to have what would be considered an optimum Doppler radar for meteorological purposes. These are: (1) 5.4-cm. wavelength, (2) pulse instead of cw techniques, and (3) provision of "sense" to determine directions of motions.

The use of 5.4-cm. wavelength would reduce the attenuation problem considerably. Since there is a clear channel, 5600–5650 mc., assigned to meteorology, its use would reduce the chances of interference with other radars operating in the C-band.

The use of pulsed instead of cw techniques would allow for a tremendous increase in power output and energy penetration into storms. In addition, it would be possible to provide for range gating which cannot be done by using the cw technique. This is a very important feature, since with the reduced attenuation and increased power output, signals would often be received from two or more storms at the same azimuth from the radar site. For example, if the beam were intersecting a nearby storm at about 5,000 feet above the ground and a distant storm at about 40,000 feet above the ground, the signal return might be similar to a composite of figures 6B and 8B. This combination would appear very much like figure 3B. For this type of situation there are two possible explanations. Either a funnel or tornado exists in the nearby storm, or the high speeds are from the distant storm at high altitudes while the lower speeds are from the nearby storm. A Doppler radar system with range gating facilities would allow the operator to determine which case existed. It is worthwhile to mention, at this point, that at the time of the unique signals from the El Dorado storm, there were no other storms at the same azimuth within the range of the Doppler radar. The same is true for the storm 15 miles from the radar site, at the same azimuth as the dust devil.

Providing "sense" to the system is a feature that would show whether the Doppler shift was upward or downward in frequency, thus allowing the operator to determine if a majority of the particles were approaching or departing from the radar site. This would be especially advantageous in overhead turbulence studies in thunderstorms and in clear air.

One of the most critical problems that meteorologists have had to face has been to obtain reliable information concerning the actual existence of a tornado or funnel cloud in sufficient time to warn those in threatened areas. It is believed that Doppler radar would aid in easing this problem so that we can greatly improve our ability to prevent loss of life due to those storms.

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NEW WEATHER BUREAU PUBLICATION

Climatology at Work, Measurements, Methods, and Machines, edited by Gerald L. Barger assisted by John C. Nyhan, Washington, D.C., October 1960, 109 pp. For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. Price 65 cents.

Describes the functions, scope, and capabilities of the centralized climatological facility located at Asheville, N.C. Chapter headings are: 1. Introduction—History and Development; 2. Climatology—Selected Elements of the Science; 3. Observations—Measurement, Enumeration, and Perception; 4. Methods—Summary, Graphical, and Statistical; 5. Machines—Processing and Computing; 6. The Product—Form and Availability.

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